

**OPSRB Project - Emissions  
Phase II - Install Power Cable**

**Maximum Emissions Occuring During QT 3-4 2015**

Emissions Source	BHP	No.	Hrs per Day per Engine	Load	Emission Factors g/bhr-hr												lbs/day								tons/year							
					NO <sub>x</sub>	ROG	PM	CO	SO <sub>2</sub>	CO <sub>2</sub>	N <sub>2</sub> O	CH <sub>4</sub>	NO <sub>x</sub>	ROG	PM	CO	SO <sub>2</sub>	CO <sub>2</sub>	N <sub>2</sub> O	CH <sub>4</sub>	Days Used	NO <sub>x</sub>	ROG	PM	CO	SO <sub>2</sub>	CO <sub>2</sub>	N <sub>2</sub> O	CH <sub>4</sub>			
<b>Offshore Equipment</b>																																
<b>Marine Equipment</b>																																
CIV Main Engine #1-2	3648	2	24	0.45	7.3080	0.6786	0.3579	1.9687	0.1268	486.2043	0.0231	0.0134	190.4293	117.8822	62.1796	341.9879	22.0219	84460.64	4.0158	2.3317	55.00	5.2368	3.2418	1.7099	9.4047	0.6056	2322.67	0.1104	0.0641			
CIV Main Engine #3-4	3487	2	24	0.45	7.3080	0.8128	0.3207	2.7815	0.1268	486.2043	0.0231	0.0164	182.0249	134.9679	53.2442	461.8625	21.0500	80733.07	3.8385	2.7241	55.00	5.0057	3.7116	1.4642	12.7012	0.5789	2220.16	0.1056	0.0749			
CIV Aux Engine #1-4	1333	2	24	0.43	7.3080	0.8128	0.3207	2.7815	0.1268	486.2043	0.0231	0.0164	66.4913	49.3020	19.4494	168.7123	7.6893	29490.74	1.4022	0.9951	55.00	1.8285	1.3558	0.5349	4.6396	0.2115	811.00	0.0386	0.0274			
Deck Crane	125	1	24	0.29	2.3200	0.1200	0.2240	3.7000	0.0049	519.0000	0.0042	0.1535	4.4498	0.2302	0.4296	7.0966	0.0094	995.44	0.0081	0.2944	55.00	0.1224	0.0063	0.0118	0.1952	0.0003	27.37	0.0002	0.0081			
CIV Emergency Gen	158	1	0.5	0.43	5.1007	0.8128	0.2163	3.7286	0.1268	486.2043	0.0231	0.0164	0.3820	0.0609	0.0162	0.2792	0.0095	36.41	0.0017	0.0012	10.00	0.0019	0.0003	0.0001	0.0014	0.0000	0.18	0.0000	0.0000			
Life Boat Engines	28	2	0.5	0.52	8.1357	1.7972	0.7233	3.6465	0.1268	486.2043	0.0231	0.0164	0.2612	0.0577	0.0232	0.1170	0.0041	15.61	0.0007	0.0005	10.00	0.0013	0.0003	0.0001	0.0006	0.0000	0.08	0.0000	0.0000			
Skiff Engines	50	3	15	0.52	8.1357	1.7972	0.7233	3.6465	0.1268	486.2043	0.0231	0.0164	20.9855	4.6355	1.8658	9.4057	0.3270	1254.10	0.0596	0.0423	20.00	0.2099	0.0464	0.0187	0.0941	0.0033	12.54	0.0006	0.0004			
AHTS Nornne Main Engine #1-2 (Tier 2 Category 2)	3040	2	24	0.50	5.5257	0.6786	0.2013	3.7286	0.1268	486.2043	0.0231	0.0134	888.8138	109.1502	32.3852	599.7262	20.3907	78204.29	3.7183	2.1590	5.00	2.2220	0.2729	0.0810	1.4993	0.0510	195.51	0.0093	0.0054			
AHTS Nornne Main Aux #1-2	138	1	24	0.31	7.3080	0.8128	0.3207	2.7815	0.1268	486.2043	0.0231	0.0164	16.5419	1.8398	0.7258	6.2959	0.2869	1100.52	0.0523	0.0371	55.00	0.4549	0.0506	0.0200	0.1731	0.0079	30.26	0.0014	0.0010			
Dive Support Main Engine #1-2	600	2	24	0.52	9.6346	0.6711	0.3579	1.9687	0.1268	486.2043	0.0231	0.1342	31.8102	2.2158	1.1818	6.4998	0.4185	1605.25	0.0763	0.4432	28.00	0.4453	0.0310	0.0165	0.0910	0.0059	22.47	0.0011	0.0062			
Dive Support Aux Engine #1-2	107	2	12	0.52	8.7472	1.1782	0.5817	3.5869	0.1268	486.2043	0.0231	0.2386	25.7516	3.4686	1.7123	10.5595	0.3732	1431.34	0.0681	0.7025	28.00	0.3605	0.0486	0.0240	0.1478	0.0052	20.04	0.0010	0.0098			
Mooring and Survey Main Engine #1-2	360	2	24	0.52	5.1007	0.6786	0.1491	3.7286	0.1268	486.2043	0.0231	0.0134	101.0441	13.4427	2.9544	73.8610	2.5113	9631.48	0.4579	0.2659	6.00	0.3031	0.0403	0.0089	0.2216	0.0075	28.89	0.0014	0.0008			
Mooring and Survey Aux Engine #1	66	1	12	0.52	8.7472	1.1782	0.5817	3.5869	0.1268	486.2043	0.0231	0.2386	7.9421	1.0698	0.5281	3.2567	0.1151	441.44	0.0210	0.2167	6.00	0.0238	0.0032	0.0016	0.0098	0.0003	1.32	0.0001	0.0006			
Mooring and Survey Aux Engine #2	32	1	12	0.52	8.1357	1.7972	0.7233	3.6465	0.1268	486.2043	0.0231	0.0164	3.5815	0.7911	0.3184	1.6052	0.0558	214.03	0.0102	0.0072	6.00	0.0107	0.0024	0.0010	0.0048	0.0002	0.64	0.0000	0.0000			
Divers Air Compressor	47	2	12	0.48	4.5500	0.1200	0.1280	4.1000	0.0049	568.3000	0.0042	0.1870	5.4312	0.1432	0.1528	4.8940	0.0058	678.35	0.0050	0.2232	6.00	0.0163	0.0004	0.0005	0.0147	0.0000	2.04	0.0000	0.0007			
<b>Total Marine Vessel Equipment (minus demolition activities)</b>																																
<b>Demolition Activities - Remove from cumulative impacts</b>																																
<b>Platform Heritage &amp; Harmony</b>																																
Pull Winch	150	2	24	0.43	2.3200	0.1200	0.2240	3.7000	0.0049	516.4100	0.0042	0.1526	15.8349	0.8190	1.5289	25.2540	0.0334	3524.70	0.0287	1.0416	75.00	0.5938	0.0307	0.0573	0.9470	0.0013	132.18	0.0011	0.0391			
Hydraulic Winch	150	4	24	0.43	2.3200	0.1200	0.2240	3.7000	0.0049	516.4100	0.0042	0.1526	31.6698	1.6381	3.0578	50.5079	0.0669	7049.41	0.0573	2.0831	75.00	1.1876	0.0614	0.1147	1.8940	0.0025	264.35	0.0022	0.0781			
Industrial Air Compressor	150	6	24	0.48	2.7400	0.1200	0.1922	3.7000	0.0049	568.2900	0.0042	0.0560	62.6286	2.7429	4.3931	84.5714	0.1120	12989.49	0.0960	1.2800	75.00	2.3486	0.1029	0.1647	3.1714	0.0042	487.11	0.0036	0.0480			
Generator	75	2	24	0.43	2.7400	0.1200	0.1920	3.7000	0.0049	568.2900	0.0042	0.0650	9.3508	0.4095	0.6552	12.6270	0.0167	1939.43	0.0143	0.2218	75.00	0.3507	0.0154	0.0246	0.4735	0.0006	72.73	0.0005	0.0083			
Air Tugger / Winch	50	7	24	0.43	2.7400	0.1200	0.1920	3.7000	0.0049	575.8700	0.0042	0.1702	21.8185	0.9556	1.5289	29.4630	0.0390	4585.63	0.0334	1.3553	75.00	0.8182	0.0358	0.0573	1.1049	0.0015	171.96	0.0013	0.0508			
Weld Machine	50	7	24	0.45	2.7400	0.1200	0.1920	3.7000	0.0049	575.8700	0.0042	0.1702	22.8333	1.0000	1.6000	30.8333	0.0408	4798.92	0.0350	1.4183	75.00	0.8563	0.0375	0.0600	1.1563	0.0015	179.96	0.0013	0.0532			
<b>Total Offshore Platform Equipment</b>																																
<b>Onshore Equipment</b>																																
<b>Off-Road Equipment</b>																																
Soil Compactor	300	3	12	0.43	2.3200	0.1200	0.0880	2.6000	0.0049	517.1200	0.0042	0.1528	23.7524	1.2286	0.9010	26.6190	0.0502	5294.32	0.0430	1.5644	45.00	0.5344	0.0276	0.0203	0.5989	0.0011	119.12	0.0010	0.0352			
Sheepsfoot Compactor	300	1	12	0.43	2.3200	0.1200	0.0880	2.6000	0.0049	517.1200	0.0042	0.1528	7.9175	0.4095	0.3003	8.8730	0.0167	1764.77	0.0143	0.5215	45.00	0.1781	0.0092	0.0068	0.1996	0.0004	39.71	0.0003	0.0117			
Excavator + Hydro Excavator	300	3	12	0.38	2.3200	0.1200	0.0880	2.6000	0.0049	515.2100	0.0042	0.1523	20.9905	1.0857	0.7962	23.5238	0.0443	4661.42	0.0380	1.3780	135.00	1.4169	0.0733	0.0537	1.5879	0.0030	314.65	0.0026	0.0930			
Skip Loader	200	2	12	0.36	2.3200	0.1200	0.0880	3.7000	0.0049	515.1700	0.0042	0.1522	8.8381	0.4571	0.3352	14.0952	0.0187	1962.55	0.0160	0.5798	135.00	0.5966	0.0309	0.0226	0.9514	0.0013	132.47	0.0011	0.0391			
Weld Machine	50	2	12	0.45	2.7400	0.1200	0.1920	3.7000	0.0049	568.2900	0.0042	0.1280	3.2619	0.1429	0.2286	4.4048	0.0058	676.54	0.0050	0.1524	45.00	0.0734	0.0032	0.0051	0.0991	0.0001	15.22	0.0001	0.0034			
Cable Pull Winch	150	2	12	0.43	2.3200	0.1200	0.2240	3.7000	0.0049	516.4100	0.0042	0.1526	7.9175	0.4095	0.7644	12.6270	0.0167	1762.35	0.0143	0.5208	45.00	0.1781	0.0092	0.0172	0.2841	0.0004	39.65	0.0003	0.0117			
Air Compressor	78	3	12	0.48	2.7400	0.1200	0.1922	3.7000	0.0049	568.2900	0.0042	0.0810	8.1417	0.3566	0.5711	10.9943	0.0146	1688.63	0.0125	0.2407	135.00	0.5496	0.0241	0.0385	0.7421	0.0010	113.98	0.0008	0.0162			
Generator	50	3	12	0.43	2.7400	0.1200	0.1920	3.7000	0.0049	568.2900	0.0042	0.1280	4.6754	0.2048	0.3276	6.3135	0.0084	969.70	0.0072	0.2184	135.00	0.3156	0.0138	0.0221	0.4262	0.0006	65.45	0.0005	0.0147			
Backhoe	100	2	12	0.37	2.7400	0.1200	0.1922	3.7000	0.0049	523.0100	0.0042	0.1546	5.3640	0.2349	0.3763	7.2434	0.0096	1023.88	0.0082	0.3027	135.00	0.3621	0.0159	0.0254	0.4889	0.0006	69.11	0.0006	0.0204			
Bobcat	100	3	12	0.37	2.7400	0.1200	0.1922	3.7000	0.0049	523.0100	0.0042	0.1546	8.0460	0.3524	0.5644	10.8651	0.0144	1535.82	0.0123	0.4540	135.00	0.5431	0.0238	0.0381	0.7334	0.0010	103.67	0.0008	0.0306			
Air Hammer	50	3	12	0.42	2.7400	0.1200	0.1920	3.7000	0.0049	575.8700	0.0042	0.1702	4.5667	0.2000	0.3200	6.1667	0.0082	959.78	0.0070	0.2837	135.00	0.3083	0.0135	0.0216	0.4163	0.0006	64.79	0.0005	0.0191			
Portable Lights	13	6	12	0.42	5.5800	1.5210	0.5400	6.2800	0.0049	575.8400	0.0042	0.1702	4.8360	1.3182	0.4680	5.4427	0.0042	499.06	0.0036	0.1475	135.00	0.3264	0.0890	0.0								

<b>OPSRB Project AIR EMISSIONS SUMMARY</b>		<b>CO2</b>	<b>N2O</b>	<b>CH4</b>	<b>MTC02E</b>
<b>Onshore</b>	Pounds/Day	24,211.90	1.98	12.06	<b>1,139.19</b>
	<b>Tons</b>	1,199.26	0.12	0.66	
<b>Offshore Platform Work</b>	Pounds/Day	34,887.58	0.26	7.40	<b>1,195.77</b>
	<b>Tons</b>	1,308.28	0.01	0.28	
<b>Cable Retrieval and Installation (Marine Vessel Emissions)</b>	Pounds/Day	290,292.70	13.74	10.44	<b>3,907.31</b>
	<b>Tons</b>	4,235.05	0.20	0.15	
<b>Demolition activities exempt from offsets / cable retrieval of out of service cables 202.F.7 Exempt</b>	Pounds/Day	Included in Offshore Above			<b>1,347.10</b>
	<b>Tons</b>	1,460.13	0.07	0.05	
<b>TOTAL - PROJECT AIR EMISSIONS</b>		<b>CO2</b>	<b>N2O</b>	<b>CH4</b>	<b>MTC02E</b>
TOTAL EMISSIONS TONS/YR		8,202.73	0.40	1.14	<b>7,589.37</b>
<b>TOTAL CUMULATIVE EMISSIONS TONS/YR</b>		<b>6,742.60</b>	<b>0.33</b>	<b>1.09</b>	<b>6,242.27</b>

<b>OPSRB Project AIR EMISSIONS SUMMARY</b>		<b>NO<sub>x</sub></b>	<b>ROG</b>	<b>PM</b>	<b>CO</b>	<b>SO<sub>2</sub></b>
<b>Onshore</b>	Pounds/Day	114.16	6.68	6.01	138.46	0.21
	<b>Tons</b>	5.75	0.35	0.31	6.98	0.01
<b>Offshore Platform Work</b>	Pounds/Day	164.14	7.57	12.76	233.26	0.31
	<b>Tons</b>	6.16	0.28	0.48	8.75	0.01
<b>Cable Retrieval and Installation (Marine Vessel Emissions)</b>	Pounds/Day	1,545.94	439.26	177.17	1,696.16	75.27
	<b>Tons</b>	12.95	6.55	2.88	21.90	1.10
<b>Demolition activities exempt from offsets / cable retrieval of out of service cables 202.F.7 Exempt</b>	Pounds/Day	Included in Offshore Above				
	<b>Tons</b>	3.29	2.27	1.01	7.29	0.38
<b>TOTAL - PROJECT AIR EMISSIONS</b>		<b>NO<sub>x</sub></b>	<b>ROG</b>	<b>PM</b>	<b>CO</b>	<b>SO<sub>2</sub></b>
TOTAL EMISSIONS TONS/YR		28.15	9.45	4.68	44.92	1.50
<b>TOTAL CUMULATIVE EMISSIONSTONS/YR</b>		<b>24.86</b>	<b>7.18</b>	<b>3.67</b>	<b>37.63</b>	<b>1.12</b>